by weight of a copper oxide and said at least one layer of aluminum nitride ceramic of said at least one side is provided with a layer of copper or copper oxide or other copper-containing compounds having a thickness of about 1.5×10^{-4} micron thick to form a substrate; and then treating said substrate at a temperature ranging from about 800 - 1300°C is in an oxygen-containing atmosphere until said intermediate layer with a desired thickness has formed.

19. A process according to claim 18, wherein treatment in said oxygen-containing atmosphere lasts until a layer thickness of about 0.5 - 10 microns has developed for said intermediate layer.

20. A process according to claim 18, wherein said aluminum nitride ceramic is treated in an oxygen-containing atmosphere, at the same time said copper-oxide containing material is reacted via the gaseous phase with said aluminum oxide.

21. A process according to claim 20, wherein said treatment in said oxygen-containing atmosphere with a copper-oxide-containing material lasts until a layer thickness of roughly 0.5 - 10 microns has developed for said intermediate layer.

22. A process according to claim 18, wherein after producing at least one intermediate layer, a metal layer is attached to said at least one intermediate layer over its surface using an oxidized metal or copper foil and further using a DCB process.

23. A process according to claim 18, wherein said at least one layer of aluminum nitride ceramic is provided on both sides with said auxiliary or intermediate layer, and wherein one metal or copper layer is applied to each of said intermediate layers using a DCB process.

24. A substrate comprising at least one layer of an aluminum nitride ceramic, an intermediate or auxiliary layer which comprises aluminum oxide (Al_2O_3) and which has a thickness of about roughly 0.5 - 10 microns provided on said surface of said at least one layer of an aluminum nitride ceramic, wherein said intermediate layer contains 0.05-44 percent by weight of at least one copper oxide, and wherein a portion of copper oxide in said intermediate layer is uniformly distributed in clusters.

a1 Cont.

25. A substrate according to claim 24, wherein said clusters have a diameter of less than about 0.01 microns.

26. A substrate according to claim 24, wherein said intermediate layer comprises a first layer of aluminum oxide which is directly adjacent to said layer of aluminum nitride ceramic and a copper oxide, and a second aluminum oxide layer which contains no copper or copper oxide.

27. A substrate according to claim 24, wherein a concentration of said copper oxide in said intermediate layer decreases with an increasing distance from said layer of aluminum nitride ceramic.

28. A substrate according to claim 24, wherein said portion of copper oxide present in said aluminum oxide is copper-aluminum-spinel ($CuAl_2O_4$ or CuAlO).

29. A substrate according to claim 24, wherein said at least one layer of aluminum nitride is joined flat on one side via said intermediate layer with a 0.1 - 0.8 mm thick copper layer or metal coating.

30. A substrate according to claim 24, wherein said copper-oxide layer is joined via an oxygen-rich copper phase, having a thickness of at least three microns, to one side of said at least on layer of aluminum nitride ceramic or to said intermediate layer.

31. A substrate according to claim 24, wherein said at least one layer of aluminum nitride contains about 0.5 - 6 percent by weight of a binder.

32. A substrate according to claim 31, wherein said binder is CaO.

33. A substrate according to claim 24, wherein a binder is present in said intermediate layer.

34. A substrate according to claim 33, wherein said binder is CaO.

35. A substrate according to claim 24, wherein at least one copper layer is applied to at least one side of said at least one layer of aluminum nitride ceramic or to said intermediate layer in a DCB process.--

REMARKS

Applicant has replaced the original specification with a substitute specification. Applicant includes a marked-up copy of the original specification for the examiner to compare. No new matter has been inserted into the specification in the substitute specification and only changes to conform the specification with U.S. practice have been made.

Applicant has cancelled claims 1-17 and replaced same with claims 18-35 to also place same in a better condition for review and examination. Multiple dependencies and a number of antecedent basis problems have been addressed.